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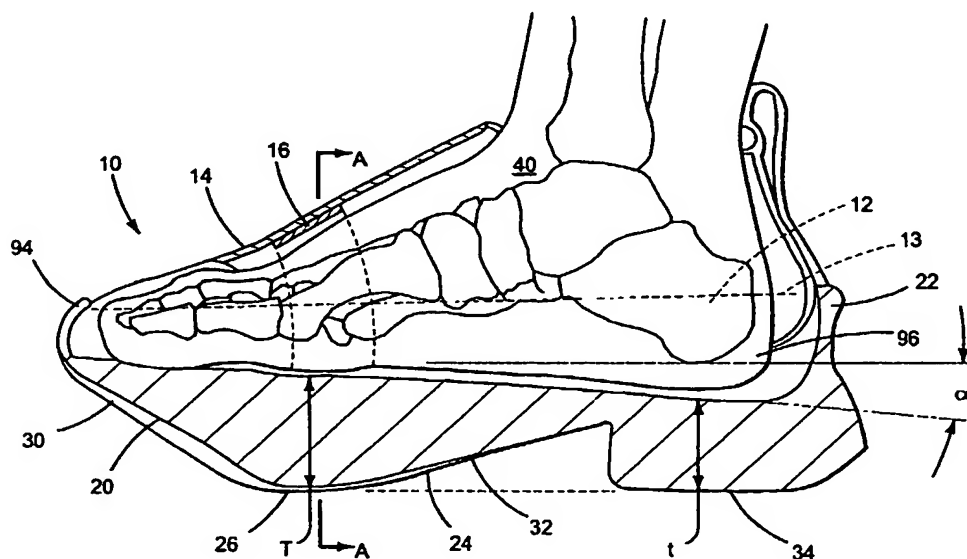
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.**
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[Continued on next page]

(54) Title: **IMPROVED DORSIFLEXION SHOE**



(57) Abstract: A high performance dorsiflexion shoe (10) has a sole and a constraining device (16) above the metatarsal-phalangeal joint. The sole has a ground-contacting surface (26), a forefoot region (30), a midfoot region (32) and a heel portion (34). The forefoot region (30) is made of a high density material, and has a thickness (T), measured in a direction perpendicular to the ground-contacting surface (26) of the sole, greater than the thickness (t) of the heel portion, thereby defining a characteristic angle (a) of declination from the forefoot region (30) to the heel portion (34). The constraining device (16) substantially constrains a wearer's metatarsal-phalangeal joints (20) from movement when exercising. The forefoot region has a curved form (28) defined so as to further minimize flexion of the metatarsalphalangeal joint (20).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ,

OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- of inventorship (Rule 4.17(iv)) for US only

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

## INTERNATIONAL SEARCH REPORT

IB2004/001887

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A43B13/14 A43B7/22 A43B7/14 A43B17/02 A43B21/26  
A43B13/18

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 472 508 A (BAKER ELIZABETH F ET AL) 14 October 1969 (1969-10-14) column 2, line 29 - column 4, line 40; figures	1
X	US 2 518 649 A (TYDINGS KENNETH S ET AL) 15 August 1950 (1950-08-15) column 2, line 28 - column 5, line 15; figures	1, 15, 16
X	WO 02/30228 A (FRYE NANCY C) 18 April 2002 (2002-04-18) page 17, line 14 - page 18, line 21; figure 9	1
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*G\* document member of the same patent family

Date of the actual completion of the international search

18 January 2005

Date of mailing of the international search report

02.02.2005

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## INTERNATIONAL SEARCH REPORT

PCT/IB2004/001887

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE EPODOC EUROPEAN PATENT OFFICE, THE HAGUE, NL; XP002312772	1-4,7,8, 12-15, 17-20, 28,33,34 22,27
Y	& HK 1 047 380 A (KO YEE MEI MIMIEUX) 7 February 2003 (2003-02-07) abstract	
P,X	-& WO 03/055343 A (KO YEEMEI MIMIEUX) 10 July 2003 (2003-07-10)	1-4,7,8, 12-15, 17-20, 28,33,34 22,27
P,Y	abstract; figures	
Y	US 2002/017039 A1 (HINES WILLIAM J) 14 February 2002 (2002-02-14) paragraph '0021! - paragraph '0027!; figures	22,27
X	US 3 990 159 A (BORGEAS ALEXANDER T) 9 November 1976 (1976-11-09) column 5, line 45 - column 6, line 10; figures	17-20, 23,24
X	US 5 265 354 A (ALIANO JR JOSEPH F) 30 November 1993 (1993-11-30) column 4, line 14 - column 5, line 61; figures 5-12 column 5, line 44 - line 50; figure 10	17,23,24
X	US 5 491 912 A (SNABB JOHN C ET AL) 20 February 1996 (1996-02-20) column 4, line 18 - line 54; figures	17,20, 23-26
X	US 2002/112373 A1 (TALBOTT DANIEL) 22 August 2002 (2002-08-22) paragraph '0045! - paragraph '0051!; figure 4B	36
A	US 6 158 151 A (WON JONG-PIL) 12 December 2000 (2000-12-12) column 3, line 46 - line 59; figures	36
A	US 3 964 181 A (HOLCOMBE JR CRESSIE E) 22 June 1976 (1976-06-22) column 2, line 1 - column 4, line 2; figures	1-3
A	US 2002/026730 A1 (WHATLEY IAN H) 7 March 2002 (2002-03-07) cited in the application the whole document	1

# INTERNATIONAL SEARCH REPORT

IB2004/001887

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16

Dorsiflexion shoe with angle  $\alpha$ , forefoot of high density material of curved form, constraining device.  
Dependent claims 4-11 are directed to a high density insert in the sole.

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2. claims: 17-35

Adaptable shoe assembly with interchangeable insole changing the angle of declination of the foot.  
Dependent claims 28-35 are directed to a high density insert in the sole.

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3. claim: 36

Dorsiflexion shoe with high density insert in forefoot, heel portion made from soft material, initial angle at most  $0$  degrees, effect of dorsiflexion shoe

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## INTERNATIONAL SEARCH REPORT

PCT/IB2004/001887

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3472508	A	14-10-1969	NONE	
US 2518649	A	15-08-1950	NONE	
WO 0230228	A	18-04-2002	US 6698050 B1 AU 2127102 A WO 0230228 A2 US 2004168351 A1	02-03-2004 22-04-2002 18-04-2002 02-09-2004
HK 1047380	A	07-02-2003	HK 1047380 A2 WO 03055343 A1	07-02-2003 10-07-2003
WO 03055343	A	10-07-2003	HK 1047380 A2 WO 03055343 A1	07-02-2003 10-07-2003
US 2002017039	A1	14-02-2002	AU 4336100 A CA 2368892 A1 JP 2002540871 T WO 0060972 A1 US 2001000835 A1	14-11-2000 19-10-2000 03-12-2002 19-10-2000 10-05-2001
US 3990159	A	09-11-1976	NONE	
US 5265354	A	30-11-1993	US 5692318 A WO 9107888 A1	02-12-1997 13-06-1991
US 5491912	A	20-02-1996	US 5752330 A	19-05-1998
US 2002112373	A1	22-08-2002	US 2004064973 A1 US 2004205983 A1 EP 1333734 A1 WO 02060291 A1	08-04-2004 21-10-2004 13-08-2003 08-08-2002
US 6158151	A	12-12-2000	KR 2000010482 A JP 3012617 B2 JP 2000041703 A	15-02-2000 28-02-2000 15-02-2000
US 3964181	A	22-06-1976	NONE	
US 2002026730	A1	07-03-2002	AU 6036198 A CN 1250355 T JP 2002513306 T WO 9831245 A1	07-08-1998 12-04-2000 08-05-2002 23-07-1998